NOVATEUR PUBLICATIONS
JournalNX- A Multidisciplinary Peer Reviewed Journal
ISSN No: 2581 - 4230
VOLUME 6, ISSUE 12, Dec. -2020

FEATURES OF DISCRETE FORECASTING METHODS

ERGASHEV A. KH.
Tojiboev Sukhrobkhon Zhafarovich

KIYOMOV YU. T.
Karshi Engineering - Economic Institute
Suxrobxon.uz@mail.ru

ABSTRACT:

The article discusses discrete methods of forecasting the development of the industry and their application in modeling economic, environmental, and technological processes.

KEYWORDS: model, optimization, discreteness, forecast, discrete transformation, regression, polynomial.

INTRODUCTION:

Before creating any object, its reduced layout, snapshot or other image, convenient for presentation, is given. This constitutes the model of the subject under consideration. Any process can be represented to some extent, it is also a model of the phenomenon under consideration.

Solving many problems, optimization and predictive models are implemented instead, that is, from the beginning, certain parameters are predicted, and then the process is optimized.

Next, we will consider building predictive models using discrete transformations. A lot of calculations are performed in the formula for the linear prediction equation when determining a_o and a_1. For the purpose of the discreteness of the parameter x, we present the following method. We take the theoretical equation in the form $y = a_o + a_1 .x.$ and based on the least squares method, we compose the following system of normal equations:

$$\begin{cases} \alpha_0 \cdot n + \alpha_1 \sum_{1} x_i = \sum_{i} y_i^* \\ \alpha_0 \cdot \sum_{i} x_i + \alpha_1 \sum_{i} x_i^2 = \sum_{i} x_i y_i^* \end{cases}$$

Now we perform such a change so that $\Sigma x_j = o$, that is, we shift x_j or re-number.

If it is possible to perform such a replacement, then the above system will take the following form:

$$\begin{cases} a_0 \cdot n = \sum y_i^* \\ a_1 \cdot \sum x_i^2 = \sum x_i y_i^* \end{cases}$$

or $$a_0 = \frac{\sum_i y_i *}{n} \qquad a_1 = \frac{\sum_i x_i y_i *}{\sum_i x_i^2}$$

For example, x = {0,1,2,3,4,5,} {-5, -3, -1, +1, +3, + 5}, that is, if the number of considered data is even, then in the center of the calculation is –1 and +1 and, respectively, the numbers on the left and right of them differ from the previous ones by two, here D means a discrete transformation (D (x) = 2x-5).

If the number of statistics is odd, for example, x = {0,1,2,3,4} and in this case 0 is in the center of the calculation, and the numbers on the left and right of it differ by 1 from the whole neighbor, this gives a good result:

{ 0, 1, 2, 3, 4 } {-2, -1, 0, 1, 2 },

x_1 x_2 x_3 x_4 x_5 x_1^* x_2^* x_3^* x_4^* x_5^*

Although here $\sum_{i=1}^{5} x_i = 10$ in $\sum_{i=1}^{5} x_i^* = 0$ the language mathematically it can be written as x * = D (x) (D (x) = x-2).

Using this method, one can artificially simplify the derivation of analytical dependences of discrete factors and speed up the calculations.

Now, for the discrete case, through the functions $y = \alpha_0 + \alpha_1 x + \alpha_2 x^2 + \alpha_3 x^3$

we perform the approximation, then the system of normal equations will take the following form:

$$\begin{cases} n\alpha_0 + \alpha\sum_i x_i + a_2\sum_i x_i^2 + a_3\sum_i x_i^3 = \sum_i y_i^* {}_1 \\ \alpha_0\sum_i x_i + a_1\sum_i x_i^2 + a_2\sum_i x_i^3 + a_3\sum_i x_i^{*4} = \sum_i x_i y_i^* {}_1 \\ \alpha_0\sum_i x_i^2 + a_1\sum_i x_i^3 + a_2\sum_i x_i^4 + a_3\sum_i x_i^{*5} = \sum_i x_i^2{}_i y_i^* {}_1 \\ \alpha_0\sum_i x_i^3 + a_1\sum_i x_i^4 + a_2\sum_i x_i^5 + a_3\sum_i x_i^6 = \sum_i x_i^3{}_i y_i^* {}_1 \end{cases}$$

if here the arguments factor satisfies the condition $\Sigma\ x_i = 0$, then from

$\sum_{i=1}^{n} x_i = 0$ condition is met $\sum_{i=1}^{n} x_i^{2K+1} = 0$, (K = 0,1,2,...).

That is, based on the above substitutions:

$\sum_{i=1}^{2m} x_i = \sum_{i=1}^{m} x_i + \sum_{i=m+1}^{2m} x_i = 0,$ as $x_1 + x_{2m} = 0$, $x_2 + x_{2m-1} = 0$,.., x_{m+} $+x_{m+1} = 0$ (for even numbers of statistics);

$\sum_{i=1}^{2m+1} x_i = \sum_{i=1}^{m} x_i + x_{m+1} + \sum_{i=m+2}^{2m+1} x_i = 0,$ as

$x_1 + x_{2m+1} = 0$, $x_2 + x_{2m} = 0$,.., $x_m + x_{m+2} = 0$, $x_{m+1}=0$ (for a variant with an odd number of statistical data). Based on them, we derive the following relation:

$\sum_{i=1}^{2m} x_i^{2K+1} = \sum_{i=1}^{m} x_i^{2K+1} + \sum_{i=m+1}^{2m} x_i^{2K+1} = 0,$ since from

$x_1 + x_{2m} = 0$

happens $x_1 = -x_{2m}$ and $x_1^{2K+1} = (-x_{2m})^{2K+1} = -x_{2m}^{2K+1}$ and hence follows $x_1^{2K+1} + x_{2m}^{2K+1} = 0$. Like this, we come to the expression $x_m^{2K+1} + x_{m+1}^{2K+1} = 0$. For a variant with an odd number of statistics, you can also deduce the correctness of this relationship. Considering all this, the above system of normal equations will take the following form:

$$\begin{cases} na_0 + a_2\sum_i x_i^2 = \sum_i y_i^*; \\ a_1\sum_i x_i^2 + a_3\sum_i x_i^4 = \sum_i x_i y_i^*; \\ a_0\sum_i x_i^2 + a_2\sum_i x_i^4 = \sum_i x_i^2 y_i^*; \\ a_1\sum_i x_i^4 + a_3\sum_i x_i^6 = \sum_i x_i^3 y_i^*; \end{cases}$$

Or it can be written by dividing it into two blocks:

$$\begin{cases} na_0 + a_2\sum_i x_i^2 = \sum_i y_i^*; \\ a_0\sum_i x_i^2 + a_2\sum_i x_i^4 = \sum_i x_i^2 y_i^*; \end{cases}$$

$$\begin{cases} a_1\sum_i x_i^2 + a_3\sum_i x_i^4 = \sum_i x_i y_i^*; \\ a_1\sum_i x_i^4 + a_3\sum_i x_i^6 = \sum_i x_i^3 y_i^*; \end{cases}$$

Having solved each separately, we determine a_0, a_2 and a_1, a_3. So, by means of a discrete transformation, which we carried out, the solution of a system of four equations with four unknowns was reduced to solving a system of 2 equations with 2 unknowns. This, in turn, simplifies and speeds up the calculation process. For example, the factor y corresponding to the values x = 40,41,42,43,44, let it take the values 843,0; 468.6; 394.6; 316.2.

table 1. Let's compose the following table

x^0	x^*	y^* (actual)	У (theoretical)
40	-2	843,0	750,32
41	-1	284,3	505,51
42	0	468,6	361,02
43	1	394,6	316,85
44	2	316,2	373,00
Amount:	0	2306,7	2306,7

Based on the above method, using the values of x * and y *, we determine the following parabolic ratio:

$$y = 361{,}02 - 94{,}33 \cdot x^* + 50{,}16 \cdot x^{*2}$$

The last equation adequately reflects the tabular values of the effective factor. The above method is very effective when the predictive equation is in the form of a high order polynomial.

REFERENCES:

1. Ergashev A.Kh. Simulation of real and abstract processes. -Karshi: Nasaf, 2002.-109 p.
2. Models and methods of the theory of logistics: textbook, 2nd ed. Ed. V.S. Lakinsky. -SPb .: Peter, 2007 .-- 448s.
3. A. ERGASHEV, S. TOZHIBOEV, L. SAMIEV. "Multicriteria dynamic model of cargo transportation in hard-to-reach and extreme situations." "Zbekiston qishlo va suv khўzhaligi" №5 sleep 2020 yil may oyi, agrar-iқtisodiy, ilmiy-ommabop magazine